

THE DEVELOPMENT OF A SELECTION GUIDE
TO READINGS IN
INSTRUCTIONAL DEVELOPMENT

CENTRE FOR NEWFOUNDLAND STUDIES

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The Development of a Selection Guide
to Readings in
Instructional Development

by



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ABSTRACT

This report includes an annotated guide to readings in Instructional Development, a section discussing the background to the guide and a section discussing the preparation of the guide. The latter two sections include explanations of the terminology, the process of instructional development, the scope of the guide and the rationale for the guide.

The guide itself is presented as an appendix in three sections. The first section of the guide is a list of books pertaining to instructional development. The second section is composed of a list of periodical articles and articles from books concerning the subject. Documents and reports in the field of instructional development constitute the third section. Full bibliographical data and a short description of the contents of each item is given in the guide. Items of special interest to beginners in the field are indicated with an asterisk.

It should be noted that this is a guide to printed materials only. Materials on microfiche have been included in the final section only because they were more readily available at the time than the original documents.

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BACKGROUND TO THE GUIDE

INTRODUCTION

'Systems' and 'systems approach' are terms which are frequently referred to in present-day society. References are made to traffic systems, urban systems, information systems and technological systems. All this has arisen as a result of research and development in problem solving and efficiency analysis, and the development of complex man-made systems during World War II (Banathy, 1968). Now systems and systems analysis have become part of education. Is this just more jargon in the field of education or is education indeed a system?

'System' has been defined in numerous ways. Bertalanffy (1968) defines system as "a complex of interacting elements (p. 55)". Other definitions which have been given are as follows:

Systems are assemblages of parts that are designed and built by man into organized wholes for the attainment of specific purposes. (Banathy, 1968; p. 12).

A system is the structure or organization of an orderly whole, clearly showing the interrelationship of the parts to each other and to the whole itself (Bern, 1965, p. 367).

Education has been proposed as meeting the criteria for a system; it has been designed by man into organized wholes for the attainment of a specific purpose. Education, however, is really a subsystem of the supra system of society and in turn it has various subsystems of its own such as the instructional system and the administrative system, each of which is organized for the attainment of specific purposes.

Research in the area of the educational use of the systems approach has been extensive but there is very little reliable data available concerning the systems approach to instruction. This approach is relatively new but indications are that it has potential for making instruction more effective and more efficient. The application of the systems approach to instruction has been termed instructional technology or instructional development. For the purposes of this report the term instructional development shall be used exclusively.

Definition

Instructional development is a relatively new term in educational circles in the Newfoundland area and thus needs to be more clearly defined. Clarence Schauer (1971) defines instructional development as "common-sense planning of co-operation to identify and define learning problems and to attempt resolution of these problems with a plan for action, evaluation, try-out, feedback and results (p. 44)." Other definitions have been given as follows:

(Instructional development) is a process for making decisions about instruction. Just as the producer of the play takes time to plan with care and imagination, the instructor can use his time to prepare the instruction in every detail. This means that ID is concerned with decisions made before the opening performance. It is a matter of designing and rehearsing instruction until it is ready to do the job. (Stowe, 1971 (b), p. 11).

(Instructional development) is a systematic process of defining and using relevant instructional goals to create effective learning activities...an instructional idea is born; it becomes defined in terms of specific goals and outcomes, which are translated in turn into instructional design specifications, from which instructional products are fabricated;

which are then tried out and revised until desired results are achieved with learners; the total of which requires a continuous flow of information (Stowe, 1971 (a), p. 35).

(Instructional development) is a process that establishes a way to examine instructional problems and sets a procedure for solving them. (Komp, 1971, p. 7).

All these definitions point to the fact that instructional development is a process or a system with specific steps which must be performed. All these steps are interrelated parts of the total process of instructional development, they all function separately but they are integrated and interact within the total system to achieve the general purpose of that system. The system as a whole must be planned, designed, developed and implemented, not its parts separately, if it is to achieve its goal.

Components of Instructional Development

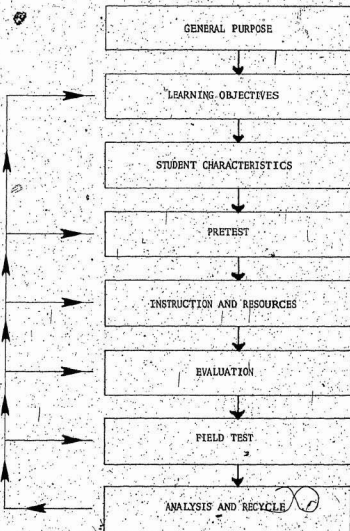
Instruction has been defined as,

the "process whereby the environment of an individual is deliberately manipulated to enable him to learn to emit or engage in specified behaviors under specified conditions or as responses to specific situations" (Merrill 1971, p. 6).

This process may be carried out in many different ways. In the past, the form which instruction took was based largely on teacher's intuition with no specific purposes or behaviors outlined. Recent developments in education, such as new knowledge about how children learn and the development of many new instructional materials, have made educators aware of the need for more precise planning of instruction. The results of these developments have been the establishment of models for instructional

Table I

A Model for Instructional Development



development. Not all these models are exactly alike and one has not been proven any better than another. However, all have incorporated the same components into some form of total system.

The instructional design which the author has developed is made up of seven components. These components are (1) statement of a general purpose, (2) statement of learning objectives, (3) examination of student characteristics, (4) administering of a pre-test, (5) development of instructional strategies and resources, (6) evaluation of the instruction, and (7) the total analysis and recycling of the instructional package. (See Table 1 for this model of instructional development showing the relationships between the various components.)

General Purposes

The first step in the process of instructional development is the statement of a general purpose. The statement of this purpose is not really the responsibility of the instructional developer but rather that of the curriculum developer. When curricula are developed, the first step is usually to make broad statements as to the desired learning outcomes for the particular subjects to be taught. Next, topics are outlined to fulfill these outcomes and then purposes are stated for the particular topics to be taught. The curriculum developer is responsible for the 'what' part of the instruction. The instructional developer steps in at this point and determines the 'how' of the instructional process.

Learning Objectives

One of the most important steps in the instructional development

process is the formation of learning objectives. "When clearly defined goals are lacking, it is impossible to evaluate a course or program efficiently, and there is no sound basis for selecting appropriate materials, content, or instructional methods (Mager, 1962, p. 3)." It is on the statement of objectives, then, that all the remainder of the instructional development process rests. When objectives are precisely stated, instructors know specifically what it is they have to teach and they can determine ways to teach and evaluate it.

An additional advantage of clearly defined objectives is that the student is provided the means to evaluate his own progress at any place along the route of instruction and is able to organize his efforts into relevant activities (Mager, 1962, p. 4).

Care must be taken in constructing these learning objectives. In order to be effective, they should be stated in behavioral terms. Learning requires activities to be performed by the student and the objectives should specify these activities. The following criteria should be met when learning objectives are being formulated:

First, identify the terminal behavior by name... Second, try to define the desired behavior further by describing the important conditions under which the behavior will be expected to occur. Third, specify the criteria of acceptable performance by describing how well the learner must perform to be considered acceptable (Mager, 1962, p. 12).

Therefore, to state as one of the objectives of a Grade One Mathematics program that 'the student must know how to count', would not be sufficient. A more acceptable way of stating this objective would be 'without the aid of concrete objects, the student should be able to count from one to one hundred with 100% accuracy.' When the objectives

are stated in this manner, teachers know exactly what they have to teach and evaluate, and the students know exactly what is expected of them.

Student Characteristics

The next step in the instructional development process is that of identifying student characteristics. These characteristics are of two kinds:

The first pertains to conditions that are primarily physical or at times, physiological. Illustrations are 'adequate' vision, hearing, physical strength and stature. The second category... pertains to behavior that must already be under the learner's control in order for him to respond appropriately to the stimuli comprising the instance of instruction (Merrill, 1971, p. 12).

The first kind of characteristic is the easier one to determine as it is for the most part, a physical trait. The second category which refers to such characteristics as attention span, IQ, or results of aptitude tests, are more difficult to determine but are usually readily available from students' records.

A third type of characteristic is more difficult to determine. It deals with prerequisites in learning a concept, for example a child must be able to add and subtract before he can multiply. It is not enough to know that a student has experienced a particular unit of instruction which would be classed as a prerequisite to the new unit to be taught. One needs also to know the student's background in and motivation for the particular subject and the degree of mastery with which the previous unit was completed. In assessing this aspect of student characteristics, individual differences play a role, for some of the students who have completed the prerequisite unit may be quite ready to

proceed to the next unit while others may not be ready at all. In designing instruction for these students, some reinforcement of the previous unit will be necessary or else the student should repeat the previous unit until mastery has been achieved.

It is necessary to know these student characteristics for they will affect such things as "decisions concerning the selection of objectives, level at which to start a topic, depth of treatment, and variety and extent of learning activities to be planned (Kemp, 1971, p. 17)."

Pretest

The pretest is the next step in the instructional development process. The pretest has two purposes; (1) to find out to what extent the students have acquired the prerequisites, and (2) to find out what the students already know about the subject to be studied (Kemp, 1971, p. 48). It is quite possible that some students may not need to be exposed to the unit of instruction at all, depending on the results of the pretest.

The construction of the pretest is very important. It is very closely related to the learning objectives and should test exactly the material which they specify is to be learned. If the learning objectives have been written behaviorally the pretest can be developed directly from them. Some instructors use the same test for the pretest and the posttest but usually it is not necessary for the pretest to be as long as the posttest, for it is examining only the general concept whereas the posttest examines the specific behaviors which have been taught.

Sometimes a formal pretest may not be practical. For example, in a beginning French course, it would be ludicrous to give a pretest developed directly from the objectives for most of the students would not have been previously exposed to the subject. In this case it is better to have some type of informal pretest such as a class discussion about any experiences individual students may have had with the subject.

On the basis of the results of the pretest, the instructional developer knows exactly the subject matter which needs to be taught. At this point there may be a need to redefine some of the objectives as some may no longer be necessary or some may need to be added if the original ones were above the ability level of the students.

Instruction and Resources

The instructional developer has now reached a point where decisions have to be made concerning the form which the instruction will take and the resources which are best suited to teach the subject matter. The learning objectives have been specified and the students have been assessed, thus the instructional developer knows by this time exactly which subject matter needs to be taught to fulfill the objectives.

Gerlach (1971, p. 13) sees this step in the instructional development process as being composed of five parts; (1) determination of strategy, (2) organization of groups, (3) allocation of time, (4) allocation of space, and (5) selection of resources. In determining the strategy, the instructional developer must decide the approach to be used in the instruction. In some cases the expository method may

be best suited, in some cases the Inquiry method, and in some cases a laboratory method. In making this decision, one has to consider the subject matter to be taught and determine which technique is best suited to it.

In organization of groups, decisions have to be made as to whether the instruction will all be done in one large group, or in a combination of large group, small group, and independent study. In more recent times, the latter approaches seem to be more appropriate for many areas of instruction, thus it is necessary to analyze which objectives the learner can reach on his own, which ones can be reached through interaction among the learners themselves and which ones can be reached through formal presentation by the teacher and through interaction between the learner and the teacher (Gerlach, 1971, p. 17).

Allocation of time and space are also factors which have to be considered when planning instruction. In a high school especially, time periods are usually specified and the instruction must be done within these limits. This type of scheduling affects the types of activities which can be undertaken. Space, again, can place restrictions on the instructional procedure. If a teacher is confined to a particular classroom, there is very little scope for small group work and independent study. On the other hand, if there is access to a Resource Centre, grouping may be done in any manner pertinent to the instruction.

Finally, and probably most important, is the selection of resources - the actual materials to be used in the instruction. Gerlach

(1971) says "media will be selected in terms of responses desired by the teacher from the learners, not in terms of stimuli alone" (p. 23). It is very important that this material gives exactly the content which the learning objectives specify. There are various sources from which a teacher may select materials - resource people, visual materials for projection, audio materials, printed materials and display materials (Gerlach, 1971, p. 23). The problem here is probably not just one of selecting appropriate materials but also one of selecting the type of media which will be most effective for a particular topic with a particular group of students.

Evaluation

Once the instruction has been performed, the evaluation step of the instructional development process becomes necessary. Evaluation shows to what degree the students have attained mastery of the subject and also serves as a means for evaluating the effectiveness of the instruction.

The evaluation should grow directly out of the learning objectives.

First, and of extreme importance, the tests must be valid in the sense that the behavior required to cope with them successfully is the behavior the instruction was designed to teach. A second requirement of a good test to appraise instruction is that the number of responses and the number of situations sampled by the tests must be sufficient to result in a reasonably stable inference regarding the presence or absence of the behavior in question. (Merrill, 1971, p. 13).

The proper construction of learning objectives, then, is all-important

to the construction of the posttest. If they are behaviorally stated, the construction of the posttest is virtually completed. The main problem here is to provide enough test items to make the evaluation meaningful.

Field Test

The instructional package is now complete - the learning objectives have been specified, the pretest has been constructed, the instruction has been planned and the posttest has been constructed. Now comes the time to implement the completed package. Before the package is used with a large group, however, it should be field tested. The entire process should be administered to a representative sample of students who have the same prerequisite characteristics as the group for which the instruction has been prepared. This field test is necessary to evaluate the entire instructional package, with respect to its application to the larger group for which it is intended.

Analysis and Recycle

The analysis and recycle step of the instructional development process is a direct response to the field test. Once the field test has been completed, the results must be analyzed to see if the instruction has been effective. If all the students have made significant progress between the pretest and the posttest and there have been no intervening factors, then it can be safely assumed that the instruction was effective. If, however, there is no significant difference in the scores of the

pretest and the posttest, some investigation is necessary. It is possible that, (1) the learning objectives specify activities too advanced or not sufficiently advanced for the group of students, (2) the pretest may not have been an accurate measure of the students' knowledge or, (3) the method of instruction may have been ineffective. All these factors must be examined and revised where necessary. It may then be necessary to field test the package again before administering it to the entire group.

When this total process has been completed, the instructional package should incorporate all the best means for implementing a particular unit or topic in the most effective and efficient way possible.

PREPARATION OF THE GUIDE

Rationale

The term 'instructional development' was virtually unknown in the field of education in Newfoundland until about five years ago. It had, however, been used extensively in various areas of the United States for at least ten years. One of the first institutions to make use of instructional development and systems design in its instructional program was American Aerospace Education. Since this time various universities in the United States - Michigan State University, Brigham Young University, Florida State University, Indiana University, Syracuse University, and Pennsylvania State University - have offered programs in instructional development for educators (Larson, 1971). These programs have produced graduates known as instructional developers who offer guidance and service to teachers who are designing instructional programs.

A course in instructional development has now been introduced into the Curriculum and Instruction Graduate Program of the Faculty of Education of Memorial University of Newfoundland. When this course was introduced there was no guide to the literature in the field which was housed at Memorial's Education Library. It was in response to this need that this selected guide to readings in instructional development was developed.

Development of the Guide

The selected guide to readings in instructional development

(Appendix) has been arranged in three sections. The first section, 'Books', includes books devoted mainly to the subject of instructional development or theories of instruction related to this subject. Included also are books concerned with the various components of instructional development, books about programmed instruction which is one area which has made great use of the instructional development process and books dealing with general systems related to the underlying philosophy of Instructional Development. 'Periodical Articles and Articles from Books', includes articles which are specifically devoted to the subject of instructional development or its components. The third section, 'Documents and Reports', includes mainly reports of experiments with instructional development and proposals for courses in the subjects at individual universities. References which are of interest to beginners in the field are indicated with an asterisk.

This guide was prepared with the aid of such materials as Education Index, Canadian Education Index, Current Index to Journals in Education, ERIC Index, and various bibliographies which were prepared for other universities of those which were given in books and articles which the author examined. Suggestions of materials for inclusion in the guide were also given by two professors in the Faculty of Education at Memorial who were involved in the field of instructional development.

The main criteria for inclusion of materials in the guide was that they be directly concerned with Instructional Development, the theories related to the process of Instructional Development or materials based on the Instructional Development process (for example, Programmed Instruction). All the materials listed in the guide were personally

examined by the author and the annotations are based totally on this examination. Materials which appeared to be appropriate for the guide and were not readily available were ordered, examined and placed in the Education Library at Memorial University. Thus, all the materials listed in the guide are presently available at Memorial.

Evaluation

The selected guide to readings in instructional development (Appendix) has been used with satisfaction by two professors who have taught the instructional development course at Memorial since its inclusion in the Graduate Program. It was at their suggestion that the references of interest to beginners in the field were indicated, as most of the students in the course were experiencing their first encounter with the process of instructional development and needed this type of direction in using the guide.

The guide has also been examined and accepted by the Director of the Centre for Audio-Visual Education and the Head of the Department of Curriculum and Instruction of the Faculty of Education of Memorial, under whose auspices the course in instructional development was introduced.

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APPENDIX

A Selection Guide to Readings in
Instructional Development

by



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BOOKS

Note: *Indicates materials of interest to beginners in the field.

Aerospace Education Foundation. Technology and Innovation in education. New York: Praeger, 1968.

An edited version of the proceedings of the 1967 seminar of the Foundation of Aerospace Education which is interested in putting the systems approach to work in American public education. The articles centre around three themes - behavioral technology, the computer as an educational tool, and the forces shaping education.

Anderson, R.C. et.al. Current research on instruction. Englewood Cliffs: Prentice-Hall, 1969.

Designed as a text or supplementary source for students of education. This book is divided into eight sections, each one dealing with some aspect of the educational process, such as research and development, behavioral objectives, and evaluation. Each section has several articles describing research done in the areas.

Banathy, B.H. Instructional systems. Palo Alto, Calif.: Fearon, 1968.

Presents recommendations for the use of the systems approach in designing curriculum. The major systems strategies are listed and the design, implementation and control of instructional systems is described.

Barber, W.H. et.al. The affective domain: A resource book for media specialists. Washington: Communication Service Corporation, 1970.

A book of seven essays dealing with human feelings and their implications for instruction. It is intended primarily for the instructional technologist.

Bertalanffy, L. Von. General system theory. New York: Brazillier, 1968.

Deals with all types of systems theory. A systems theory is so prominent in our present society, this book attempts to offer the student of systems science a broadened perspective and the general reader a panoramic view of the development.

Bloom, B. (Ed.) Taxonomy of educational objectives, handbook I: Cognitive domain. New York: Longmans, 1956.

A classification and description of the cognitive goals of our educational system with sample objectives and test items. It is intended to be of help to all teachers and administrators who deal with curricular and evaluation problems.

Briggs, L.J. et.al. Instructional media: A procedure for the design of multi-media instruction, a critical review of research and suggestions for future research. Pittsburgh: American Institute for Research, 1967.

A report compiled concerning the problem of choosing and applying new media in the school. It also includes a review of the literature on audio-visual media instruction and some conclusions and recommendations for solving the problem.

Bruner, J. Toward a theory of instruction. Cambridge, Mass.: Harvard University Press, 1966.

Describes factors which influence learning and discusses their implications for instructional design.

Coulson, J.E. (Ed.) Programmed learning and computer-based instruction. New York: Wiley, 1962.

Based on the proceedings of the Conference on Application of Digital Computers to Automated Instruction - Oct. 10-12, 1961. This conference was organized to bring together scientists and scholars from the three areas of programmed instruction - computer use, development, and education. The papers included in this book deal mainly with programmed learning and the use of computers to automate instruction.

De Cecco, J.P. (Ed.) Educational technology - Readings in programmed instruction. New York: Holt, Rinehart & Winston, 1964.

A collection of readings which brings together research reports and theoretical discussions concerning educational technology. The book illustrates two developments in programmed instruction - Skinner's model of operant conditioning as part of educational technology and the design of instructional systems.

Deterline, W.A. Introduction to programmed instruction. Englewood Cliffs: Prentice-Hall, 1962.

Presents an introduction to programmed learning. This book deals with learning theories on which programmed learning is based; discusses auto-instructional methods and analyzes the relationship of programmed learning

to our present educational structures.

Editors of Education U.S.A. Technology in education: New developments in technology herald an impending revolution in American education.
Washington: National School Public Relations Association, 1967.

Deals with the technological revolution in American education. Such topics as where we are in education now, student-teacher relationships, individualized instruction and federal control are discussed. A list of sources is also given.

Esbensen, T. Working with individualized instruction: The Duluth experience.
Belmont, Calif.: Fearon, 1968.

A description of how one school district took it upon itself to give its pupils individualized instruction. The first chapter gives a background of individualized instruction with much emphasis on behavioral objectives. The remaining chapters describe projects which were carried out in the area - one in a school of high achievers, one in a school of low achievers and one in an open space school.

Finn, J.D. et al. Studies in the growth of instructional technology I: Audiovisual instrumentation for instruction in the public schools, 1930-1960, a basis for take-off. National Education Association, Technological Development Project, 1962.

A study undertaken by the Technological Development Project to assess the growth of instructional technology in the American school system over a thirty year period. It gives a background of the growth in other areas of education (schools, school districts, teachers, students) and then assesses the degree of growth of various pieces of audio-visual equipment over the same period, on the basis that equipment supply is a measure of the capability of certain kinds of instruction. The conclusion reached is that education is ready for the technological revolution.

Gage, N.L. Handbook of research on teaching. Chicago: Rand-McNally, 1963.

A summary of research in many areas of education including an extensive section on educational technology, (Chapter 12).

Gagne, R.M. The conditions of learning. New York: Holt, Rinehart & Winston, 1965.

Describes eight types of learning and the conditions necessary for the implementation of each type. It also gives a brief account of the implications for the design of instruction and briefly discusses the resources for learning.

Gagne, R.M. Learning and individual differences. Columbus, Ohio: Merrill, 1967.

A collection of papers presented at a symposium at the Learning Research and Development Center, University of Pittsburgh. It provides a survey of views on individual differences. Of particular interest to the instructional developer is Chapter Two, in which Cronbach describes a number of patterns of instruction and their implications for individual differences.

Gagne, R.M. (Ed.) Psychological principles in system development. New York: Holt, Rinehart & Winston, 1962.

Brings together much of the knowledge relevant to system development to show its origins in psychological research. Each chapter provides a description of the technology employed at a particular stage of the development of the "man" section of the man-machine system. Examples of these techniques are given along with their relation to relevant aspects of the science of human behavior.

Gerlach, V.S. & Ely, D.P. Teaching and media: A systematic approach. Englewood Cliffs: Prentice-Hall, 1971.

An examination of the systems approach to instruction. The book begins with a general introduction to systematic instruction and then examines each phase in detail. The final chapter gives a short overview of the different types of media.

Glaser, R. (Ed.) Training research and education. Pittsburgh: University of Pittsburgh Press, 1962.

A collection of articles which examines training research accomplished by experimental psychologists and considers the implications for education in general. The book is organized around the following components - instructional goals, entering behavior, instructional procedures, performance assessment, and research and development logistics. Each component is examined in the light of the research carried out and the implications for education.

Grden E.J. The learning process and programmed instruction. New York: Holt, Rinehart & Winston, 1962.

Describes various controls of behavior and their application to instruction and learning with particular emphasis on programmed instruction.

Kemp, J.E. Instructional design: a plan for unit and course development.

Belmont, Calif.: Fearon, 1971.

Presents an instructional design for unit and course development. Parts one and two present the eight steps in the instructional design: (1) topics and general purpose, (2) student characteristics, (3) learning objectives, (4) subject content, (5) pre-test, (6) teaching/learning activities and resources, (7) support services, and (8) evaluation. Part three discusses the mechanics of the planning process, techniques for working with teachers and support personnel to insure success of the program and ways to measure the success of the program.

Knirk, F.G. & Childs, J.W. (Ed.) Instructional technology: A book of readings. New York: Holt, Rinehart & Winston, 1968.

A book of readings intended to provide a basis for understanding the problems and promises of instructional technology. It examines such areas as technological change in school and society, systems design, media characteristics, information storage and retrieval, school plant design, and economics of comparative educational systems and learning theory as they are related to technology.

Krathwohl, D.R., Bloom, B.S., & Masia, B.B. Taxonomy of educational goals. Handbook II: Affective domain. New York: David McKay Co., 1964.

A classification and description of the affective domain of our educational system. The book is divided into two main parts. Part I describes the nature of the affective domain and Part II gives the classification scheme with sample objectives and test items.

Larson, L.C. Instructional technology graduate degree programs in U.S. colleges and universities 1969-71. Washington: Association for Educational Communications and Technology, 1971.

A directory which gives a quick run-down of sixty-seven institutions in the United States offering some sort of program in educational technology. It lists such information as the degrees offered, students enrolled, financial assistance and a brief description of the program.

Lipsitz, L. (Ed.) Technology and education: Articles from Educational Technology Magazine. Englewood Cliffs: Educational Technology Publications, 1971.

A collection of articles which have been published from time to time in the Educational Technology Magazine. They deal with such topics as the definition of instructional technology, instructional media, programmed instruction, computer assisted instruction, educational objectives and the mass media, all of which are of concern to the instructional developer.

Loughary, J.W. Man-machine systems in education. New York: Harper & Row, 1966.

Deals with the nature and application of computers, media technology, and systems technology to instruction, administration, and pupil-personnel services. This book also gives some background to and discusses the implementation of man-machine systems in education.

Lumsdaine, A.A. & Glaser, R. (Ed.) Teaching machines and programmed learning: A source book. Washington: Department of Audio-Visual Instruction; National Education Association, 1960.

Provides a comprehensive reference source on teaching machines and the techniques of instruction associated with them. This book is divided into five parts; part one provides an overview of development in teaching machines; part two covers the early years and mainly the work of Pressey; part three deals with the work of Skinner; part four deals with the work not directly connected with the work of Skinner and Pressey, and part five deals with more recent developments.

Mager, R.F. Preparing instructional objectives. San Francisco: Fearon, 1962.

A programmed text which describes how to specify behavioral objectives. It deals with the need for, the identification of, the composition of and the evaluation of behavioral objectives.

Merrill, M.D. (Ed.) Instructional design: Readings. Englewood Cliffs: Prentice-Hall, 1971.

A collection of articles concerning different aspects of instructional development. The book divides instructional design into five parts: (1) fundamentals, (2) analyzing the characteristics of subject matter competence, (3) diagnosing preinstructional behavior, (4) carrying out the instructional process, and (5) measuring learning outcomes. Various articles by different people are presented in each part.

National Society for the Study of Education: Theories of learning and instruction. Chicago: University of Chicago Press, 1964.

A collection of papers on various learning theories and learning factors such as motivation and creativity, and their application to education.

Popham, W.J. & Baker, E.I. Systematic instruction. Englewood Cliffs: Prentice-Hall, 1970.

Deals with the nature of instruction and presents a four-part model for instruction by which teachers can greatly improve their activity in the classroom. The four parts of the model are (1) objectives, (2) pre-assessment, (3) instruction, and (4) evaluation and each of these is discussed in view of the classroom situation.

Richmond, W.K. The concept of educational technology. London: Weidenfeld & Nicolson, 1970.

Begins with a discussion of the meaning of the term educational technology. The book then traces the origins of technology and proceeds to discuss programmed learning, communication systems and the media. The arrangement of the book is an interesting one, being a collection of short articles followed by suggestions and questions for discussion. This format provides a good stimulus for discussion groups and encourages people to think for themselves.

Seattler, P. History of instructional technology. New York: McGraw-Hill, 1968.

One of the first books written on the history of instructional technology. It covers the development of a technology of instruction in American education from the late nineteenth century to the present. It also looks at the theoretical foundations of the system and gives a short prospective view of instructional technology in the future.

Siegel, L. Instruction: Some contemporary viewpoints. San Francisco: Chandler, 1967.

Presents various contemporary theories about instruction, each written by the person responsible for the theory. The book is organized in clusters of formulations emphasizing teaching, learning, and teaching and learning both. It is intended as a textbook and source book for students in sociology, psychology and education.

Skinner, B.F. The technology of teaching. New York: Appleton-Century Crofts, 1968.

A collection of papers presented by the author on the technology of teaching. Chapters three and four are particularly relevant to instructional technology and describe applications of behavioral science to education.

Trow, W.C. Teacher and technology - New designs for learning. New York: Appleton-Century Crofts, 1963.

Considers the relationship between the means available for instruction and their effectiveness in the different kinds of learning experiences which are provided. The author considers the need for, and possibilities of, grouping various media into patterns of instruction which are workable at all levels of education.

Unwin, D. & Leedham, J. Aspects of educational technology. New York: Methuen, 1967.

A collection of forty-three papers read at the Loughsbrough Programmed Learning Conference in 1966. The papers deal with many of the various aspects of educational technology such as programmed instruction, mathematics, computer assisted instruction and the feedback classroom, giving descriptions and results of research carried out in the various areas.

Unwin, D. Media and methods. London: McGraw-Hill, 1969.

Written mainly as an introduction to educational technology for the secondary school teacher and the university professor. Several chapters discuss educational technology in a general manner, some describe new media and others review and discuss their place and the contribution they make in higher education.

Witt, P.F. Technology and the curriculum. New York: Columbia University, Teachers' College Press, 1967.

A collection of papers presented at the 1967 Conference of the Teachers' College Department of Curriculum and Teaching. These papers are all devoted to the subject of educational technology and cover such aspects as its ever expanding and increasing powerful influences, its influence on present day society and the role of teachers, curriculum specialists, and professors of education.

II

PERIODICAL ARTICLES AND ARTICLES FROM BOOKS

Abedon, A.J. & Gustafson, K.L. Evaluating instructional development programs: Two sets of criteria. Audiovisual Instruction, 1971, 16 (10), 21-25.

States that program evaluation is becoming a critical issue in the field of instructional development. The article then proceeds to discuss types of evaluation and to set up criteria for the evaluation of programs.

Austwick, K. Towards a technology of instruction. In G. Baron & W. Taylor, Educational administration and the social sciences. London: Athlone Press, 1969.

Discusses the effect of educational technology on the administration of a school. Austwick gives examples of effects and then proceeds to look at the total system in terms of the changes required in introducing educational technology.

Bern, H.A. et al. Reply to questions about systems. Audiovisual Instruction, 1965, 10, 366-370.

A series of questions and answers about systems, answered by workers in the systems field. They cover such areas as; what is a system? what is a systems approach to instruction? how can the systems approach be put into operation? and how can it allow for change?

Bishop, L.J. Technology and the possible curriculum. Audiovisual Instruction, 1968, 13, 223-226.

Deals with the idea that technology can make possible a new curriculum. It can function better in giving individual attention to pupils. In short, technology can portray the curriculum as a dynamic, behaving learner, rather than as a static plan or device.

Bloom, B.S. Learning for mastery. Evaluation Comment, 1968, 1 (2).

Contends that most students can master subject matter if teaching is approached in the correct manner. Attention must be given to the aptitude of a student for a subject and students whose aptitudes are low must be given extra time, and alternate instructional materials and methods to meet their needs. It may take somewhat longer but these people can

achieve a mastery level.

Bratten, J.C. A systems approach to the improvement of instruction. In D. Unwin, Media and methods. London: McGraw-Hill, 1969.

An attempt to provide a description of the systems approach to instruction. Bratten analyzes the terms 'system' and 'systems approach', illustrates the concept of system analysis and illustrates how the systems approach has been used to improve instruction.

Britt, D.H. An improved method for instructional development: Learner types. Audiovisual Instruction, 1971, 16 (4), 14-15.

Deals with the development of learner types for a more effective implementation of instructional development. A description of research carried out in this area at the University of Cambridge is given and three examples of learner types are outlined.

Brown, R.M. Instructional systems development: Cost and content in college courses. Educational Technology, 1971, 11 (5), 26-27.

Discusses the cost of instructional systems development in college courses. This cost is quite high compared to the cost of current instruction and either courses will have to be increased or the results must be such that the extra money would be worthwhile. In this light two college courses are examined and various conclusions reached.

Buley, H.C. Multimedia systems of instruction. Audiovisual Instruction, 1965, 10, 391-392.

A brief description of a systems approach to instruction in operation at Southern Connecticut State College, which has a universal number of available instructional media and resources. Some assessment is made of the program on the basis of one year of operation.

Buterbaugh, J.G. Institute for learning model. Audiovisual Instruction, 1971, 16 (10), 26-27.

Develops an 'Institute for Learning Model' to illustrate the educational development relationship to instructional design. The article then outlines a procedure for the implementation of a university institute for learning.

Cabeceiras, J. Systematizing a nursing degree program. = 111. Audiovisual Instruction, 1971, 16 (8), 12-15.

A description of how independent learning laboratories were introduced

into the nursing degree program at San Jose State College. The Ill was integrated into a three-part procedure - large group instruction, small group instruction, and independent learning and was organized on the systems approach basis.

* Canfield, A.A. Instructional systems development. Educational Screen and AV Guide, 1967, 46 (16), 28-29

Discusses the instructional systems approach to education. The article deals with a definition of the approach, the activities involved and the instructional systems designer.

Canfield, A.A. A rationale for performance objectives. Audiovisual Instruction, 1968, 13, 127-129.

Suggests that a behavioral objective specifying tasks, conditions and criteria is not sufficient. This tells the student only what he is required to do, not why he is to do it. Canfield suggests a statement of rationale should be included in the objectives and gives various examples of this type of statement.

Carlock, P.D. Instructional development in a Junior College District. Audiovisual Instruction, 1971, 16 (10), 51-52.

A description of the steps taken in implementing a course of instruction in the Junior College District of St. Louis, St. Louis County.

* Churchman, C.W. On the design of educational systems. Audiovisual Instruction, 1965, 10, 361-365.

Begins by asking the question 'is there much more to the recent emphasis on systems besides renaming traditional approaches to the study of education?' The article then goes on to describe some of the thinking that has gone on about the systems approach. It concludes that much more research is necessary before true benefit can be measured.

Crawford, D.G. & Ragsdale, R.G. Individual quasi instructional systems for the '70's. Interchange, 1970, 1 (4), 70-81.

Deals with some of the problems of, and suggests some solutions to, instructional planning, design and implementation. The article outlines some of the changes necessary for new instructional systems to be effective and the new roles that will have to be assumed by the personnel involved.

* Cress, H. Instructional development in the high school. Audiovisual Instruction, 1971, 16 (10), 56.

Notes that high school media specialists have not been heard from very much in regard to instructional development. Cress sees instructional development in the high school as an interaction between the teacher and the media specialist and he outlines the steps in the process.

* Diamond, R.M. Instructional development - Fact or fiction. Audiovisual Instruction, 1971, 16 (10), 6-7.

Asks the question 'are we what we say we are?' referring, of course, to Instructional Developers. Diamond claims Instructional Developers are not seeing the results they should. He suggests where they are failing and gives many helpful suggestions for effective development.

Dietrich, J.E. et.al. Media development: A part of instructional change. Audiovisual Instruction, 1965, 10, 393-395.

A description of three programs at Michigan State University - Educational Development Program, Learning Systems Institute and Instructional Systems Development Division - which are faculty concerns for instructional innovations. On request these programs develop instructional programs and procedures for courses at the University.

Douglas, H.L. Instructional development in three phases. Audiovisual Instruction, 1971, 16 (10), 46-50.

A description of systematic instructional development which has been going on at Burlington County College in Pemberton, New Jersey. The 'model' for instructional development described here is divided into two parts and part two into three phases, making a project last from three to five years if it goes through all the stages.

Eraut, M.R. An instructional systems approach to course development. AV Communication Review, 1967, 15, 92-101.

An attempt to summarize and advocate a methodology for course development along the instructional systems approach. A course is called an instructional system and a prototype for its development is set up.

* Faris, G. Would you believe an instructional developer? Audiovisual Instruction, 1968, 13, 971-973.

Emphasizes the need for Instructional Developers to solve the problems of instruction in the schools of the future. Faris has developed a flowchart to illustrate the type of skills an Instructional Developer should have.

Finn, J.D. Instructional technology. Audiovisual Instruction, 1965, 10, 192-194.

A paper presented by James Finn which proposed changing the name of the Department of Audio-Visual Instruction to either the Department of Instructional Technology or the Department of Educational Technology. He supports this proposal by explaining that technology is all-encompassing (man, machine and material) in education.

Finn, J.D. Instructional technology. Bulletin of the National Association for Secondary School Principals, 1963, 47 (283), 99-119.

An attempt to define instructional technology and the course it is taking. Finn outlines what this means to the secondary school administrator and the action he should be taking. He then goes on to describe a number of innovations which have been introduced into various secondary schools in the United States.

Gage, N.L. An analytical approach to research on instructional methods. Phi Delta Kappan, 1968, 49, 601-606.

Describes some of the research taking place at the Stanford Center for Research and Development on Instructional Development. The article traces the research from the past to the present, from the general to the specific and attempts to look forward to the future.

Gagne, R.M. The acquisition of knowledge. Psychological Review, 1962, 69, 355-365.

Expresses some of Gagne's theories on task analysis, sequencing of tasks and internal transfer and shows some of his skepticism about the usefulness of traditional learning principles in the development of programmed learning.

Gibson, T.L. Instructional systems design through in-service education. Audiovisual Instruction, 1968, 13, 710-714.

Describes an in-service program which was carried out in Michigan's Upper Peninsula to make teachers more familiar with the systems approach to instruction. The program was successful in that teachers became aware of the systems approach and implemented some of the ideas.

Glaser, R. Educational technology as instructional design. Educational Technology, 1968, 8 (1), 5-6.

Foresees the emergence of an occupational speciality called

educational technology or instructional design. Glaser then continues to describe the system in terms of the types of people it will involve and the type of work they will be involved in performing.

Glaser, R. Psychological bases for instructional design. AV Communication Review, 1966, 14, 433-449.

Describes a possible framework around which instructional technologists can carry out their jobs. Four components of instructional design are considered; (1) analyzing the components of subject-matter competence, (2) diagnosing preinstructional behavior, (3) carrying out the instructional process, and (4) measuring learning outcomes.

Grimes, G.H. & Doyle, J. Development, design and the process of change in education. Audiovisual Instruction, 1971, 16 (10), 53-55.

Examines three leading views on educational change in trying to determine the scope of instructional development. The conclusion reached is that instructional development is a sub-set of educational development concerned mainly with the systematic design of the process of instruction.

Hanley, J.B., Lange, P.C. & Barson, J. The heuristic dimension of instructional development. AV Communication Review, 1968, 16, 358-371.

A report by an evaluation team which investigated a two-year study of instructional development at four major universities. Eighteen heuristics are outlined as possible guidelines for the instructional developer and the media specialist to follow in order to be effective in their work.

Harcleroad, F. Theoretical formulations of audiovisual communications. Review of Educational Research, 1962, 32, 119-126.

Outlines changes which have occurred in audiovisual communications in the United States between 1956 and 1962. Several social trends affecting the development are outlined and various theoretical concepts are put forward to account for the great changes which have occurred over the six year period.

Hawkrige, D.G. Application of educational technology at the Open University. AV Communication Review, 1972, 20, 5-15.

Describes the Open University at Bletchley, England, and in particular the work of the Institute of Educational Technology there. The work of the Institute falls into two categories - course development and instructional research, both of which are considered necessary by the University.

Heinich, R. What is instructional technology? Audiovisual Instruction, 1968,

13, 220-222.

Discusses the definition of educational technology - a systems approach to the entire instructional process - and its effects on the curriculum and teachers of a school.

Ingalls, R.E. & Moakley, F.X. Systems approach to development of a complete psychology course of study. Audiovisual Instruction, 1971, 16 (6), 78.

A description of how the systems approach is being applied to a psychology course at Northeastern University, Boston, Mass. The work in progress is an attempt at improving large group instruction and some of the techniques and results are described.

Kaufman, R.A. The teacher and technology. Audiovisual Instruction, 1968, 13, 326-327.

Describes the instructional development process and discusses its implications for teachers in the future.

Kemp, J.E. Implementing our professional role. Audiovisual Instruction, 1969, 14, 25-28.

Assesses the role of the media specialist in the schools of the present. Kemp looks at the role the specialist should be performing (an analyst and developer of instruction), the role he is performing (a dispenser of materials) and ways of implementing the correct role.

Krathwohl, D.R. Stating objectives appropriately for program, for curriculum and for instructional materials development. Journal of Teacher Education, 1965, 16, 83-92.

Deals with the use of educational objectives at several levels of detail in the educational process. Three levels are proposed; (1) a general level for program planning, (2) an intermediate level for curriculum development, and (3) a specific level for instructional material development. Two existing frameworks for developing objectives - Bloom's Taxonomy of Educational Objectives and a classification of capabilities developed by Gage - are then examined.

Lange, P.C. Technology, learning and instruction. Audiovisual Instruction, 1968, 13, 226-231.

Discusses technology, learning and instruction and how they are interrelated to one another. The theory is put forward that technology has humanized man and the main reason educators fear it is because it is a threat to their habits and prejudices. Educational technology

systematizes objectives and instruction, therefore educators must work toward developing it.

* Lee, A.M. An administrator's guide to instructional development. Audiovisual Instruction, 1971, 16 (10), 18-20.

Outlines six levels of operation of Instructional Development, the people who operate at these levels and the kind of training they receive. Nine guidelines are then given for anyone connected with implementing the instructional development process.

Lehmann, H. The systems approach to education. Audiovisual Instruction, 1968, 13, 144-148.

A summary of materials developed by the Systems Approach to Education Panel who spent a year investigating the systems approach. The report is finalized into the following eight steps; (a) statement of the need, (2) determination of learning objectives; (3) preparation of a comprehensive list of complaints, (4) preparation of a list of solutions, (5) selection of the best candidate solution, (6) implementation of the solution, (7) evaluation of the solution, and (8) modification on the basis of the evaluation.

Leonard, W.P. A third approach to the subject of instructional development activities. Audiovisual Instruction, 1971, 16 (4), 164.

Discusses financial support of instructional development activities. Leonard describes the two most common methods - outside funding and local self-initiated funding - and then proposes a third method which would involve the establishment of a formal mechanism within the educational environment which would be responsible for fostering instructional development activities.

Lumsdaine, A.A. Educational technology, programmed learning and instructional science. In National Society for the Study of Education, Theories of learning and instruction. Chicago: University of Chicago Press, 1964.

Deals with three recent developments in education - educational technology, programmed learning and instructional science. Each of these developments is discussed in detail as to the activities they involve and the implications which they have for education in the future.

Meals, D.W. Heuristic models for systems planning. Phi Delta Kappan, 1967, 48, 199-203.

Presents a case for introducing systems analysis into education. The advantages of the process, the tools of the systems analyst, and the conditions and training necessary for successful operation are outlined.

Norberg, K. et.al. The role of the media professional in education. Audiovisual Instruction, 1967, 12, 1026-1029.

Discusses the changing role of the media specialist as a result of the new technology. He is no longer a distributor of materials but a designer of instructional systems. Outlines of the duties of a media specialist are given for different levels of education and some indication is given of the preparations required.

* Nord, J.R. A search for meaning. Audiovisual Instruction, 1971, 16 (10), 11-17.

A search for the meaning of instructional development. Nord does not define the term, but in searching for the meaning he focuses on the central tendencies - the sub-elements which make up the whole - rather than defining the perimeters. In his search for meaning he finds three central foci; input, process and output.

Peterson, C.J. Multi-sensory tutorial instruction in associate degree nursing education. Audiovisual Instruction, 1971, 16 (8), 16-18.

A short description of the nursing program at St. Mary's Junior College, which is designed around Abraham Maslow's theory of the hierarchy of basic human needs. Much emphasis has been placed on the development of behavioral objectives and there is sound curriculum development providing an ideal basis for a multimedia approach.

Reid, R.L. Educational technology - the background and the need. In D. Unwin (Ed.), Media and Methods. London: McGraw-Hill, 1969.

Concerned with some of the problems of technological development in higher education. Reid discusses educational technology and then proceeds to report the findings of the Hale Report on University teaching methods and the Brymer Jones Report on audiovisual aids.

Saettler, P. Instructional technology: Some concerns and desiderata. AV Communication Review, 1969, 17, 357-367.

Discusses the conceptual, methodological, and political aspects of instructional technology. Through this a proposal for instructional technology is formed, based on research and development and training programs for Instructional Technologists.

* Schauer, C. A vice-president looks at instructional development. Audiovisual Instruction, 1971, 16 (10), 43-45.

Claims a 'system' is necessary for improvement in relations between teachers, administrators, and specialists. A brief description of instructional development at William Rainey Harper College is given and

points to be considered in establishing an instructional development program are outlined.

Scholl, P.A. Instructional development from the learner's point of view. Audiovisual Instruction, 1972, 17, 18-20.

Discusses the learner as the central concern in the instructional development process. The student should be given the right to decide his own way to learn and his own learning sequence and the instructional developer should provide as many alternatives as possible from which he may choose.

Schure, A. Educational escalation through system analysis. Audiovisual Instruction, 1965, 10, 371-377.

A description of Project ULTRA (Unlimited Training for All) at the New York Institute of Technology. The project is based on the systems approach to education and is founded on the assumption that through a systems approach a model educational system will evolve which can be implemented on a mass basis, yet will give everyone the opportunity to follow their individual interests. A prime objective of the project is to extend educational opportunity to students who normally would be deprived of this educational possibility.

Short, S. Innovations in nutrition education. Audiovisual Instruction, 1971, 16 (8), 19-21.

A description of some of the techniques of instruction of the Department of Nutrition and Food Science at Syracuse University. These techniques are based on the systems approach and are proving to be quite successful.

Stewart, D.K. The articulated instructional media program at the University of Wisconsin. Audiovisual Instruction, 1965, 10, 380-382.

Gives a short description of the Articulated Instructional Media Program at the University of Wisconsin. This program is designed to extend higher education through new patterns of teaching and learning. A short description of the learning systems concept is also given.

Stolurow, L.M. Implications of current research and future trends. Journal of Educational Research, 1962, 55, 519-527.

Makes several predictions about the future of programmed instruction. The author feels programmed learning and teaching machines are here to stay and they will contribute to a theory of teaching.

Stolurow, L.M. Programmed instruction and teaching machines. In P.H. Rossi, The new media and education: Their impact on society. New York, Doubleday, 1966.

Talks about the transition to programmed instruction and teaching machines. Some of the problems in introducing programmed instruction are considered as well as some basic principles, research findings and implications for the future of education.

Stowe, R.A. The critical issue in instructional development. Audiovisual Instruction, 1971, 16 (10), 8-10.

Puts forward a theory that the most crucial issue in instructional development is cost. Four ways of overcoming this issue are then discussed; (1) outside aid, (2) automating development, (3) automating instruction, and (4) cost sharing.

Stowe, R.A. The Division for Instructional Development. Audiovisual Instruction, 1971, 16 (6), 35-36.

Describes the formation of the Division for Instructional Development of the National Education Association. The purposes of the division, - to refine the instructional development process, to disseminate findings of both theoretical and practical interest and to build leadership in the field, - are stated and summaries are given of papers presented at the initial session.

Stowe, R.A. Instructional development's the thing. Audiovisual Instruction, 1971, 16 (4), 8-10.

Makes an analogy between the producer of a play and instruction. Instructional development can assist greatly because it is based on three kinds of information; (1) knowledge of the learner, (2) knowledge of the constraints, and (3) knowledge of the strategies.

Stowe, R.A. Putting salt on the tiger's tail or how to work with teachers. Audiovisual Instruction, 1968, 13, 335-337.

Suggests ways in which the media specialist should deal with the teacher. The teacher should be treated as a learner to insure that he understands what is being done. Programmed instruction and systems approach have greatly helped the media specialist in recent years and ways of making teachers familiar with these concepts are discussed.

Stowe, R.A. What is instructional development? Audiovisual Instruction, 1971, 16 (2), 88.

An attempt to answer the question "what is instructional development?" Definitions from several experts in the field are quoted and then Stowe proceeds with his own answer. He says the orientation of instructional development is the facilitation of learning under the most efficient conditions.

Tosti, D.T. & Ball, J.R. A behavioral approach to instructional design and media selection. AV Communication Review, 1969, 17, 5-25.

Proposes a new model for instructional systems design and develops a system component called a 'presentation form'. This model is designed to be a form of presentation independent of media, content and learner. Research done in this area is also included in the article.

Ullmer, E.J. Instructional development in higher education: Basic premises of a learner centered approach. Educational Technology, 1969, 9 (4), 10-16.

Discusses some of the defects of higher education and its need for reform. Some of the more common weaknesses are pointed out and ten basic premises for curriculum design in higher education are given.

Ullmer, E.J. The meaning of instructional technology: An operational analysis. Educational Technology, 1968, 8 (23), 10-14.

Attempts to present an interpretation of instructional technology from an operational standpoint. Ullmer does this by indicating requirements for, and products of instructional design. A model for the process is also outlined.

III

DOCUMENTS AND REPORTS

Barson, J. Instructional systems development: A demonstration and evaluation project. East Lansing, Mich.: Michigan State University, 1967 (ERIC ED 020 673).

A report of a project carried out by four United States universities in connection with the Instructional Media Center at Michigan State University, to test, demonstrate and refine a model for media innovation and instructional development. Descriptions of the project and the recommendations proposed by each university are given.

Barson, J. A procedural and cost analysis study of media in instructional systems development: Parts A & B. East Lansing, Mich.: Michigan State University, 1965 (ERIC ED 011 959).

A two-part study conducted to identify the factors which contributed to successful media innovation and instructional development and to establish guidelines to serve others. In Part A, Barson studies media support agencies, courses using new media, and development activity costs. In Part B, he developed an allocation scheme for institutes of higher learning.

Bjerstedt, A. Systems analysis in instructional programming: The initial phase of the program construction process. Malmo, Sweden: School of Education, Department of Educational and Psychological Research, 1971 (ERIC ED 051 674).

Focuses on the system analysis phase of the construction of a self-instructional system. A systematic method of determining instructional goals is recommended and some of the mechanical and non-mechanical devices available to present an instructional system are described and evaluated.

Bjerstedt, A. System modification and evaluation in instructional programming: The final phase of the program construction process. Malmo, Sweden: School of Education, Department of Educational and Psychological Research, 1971 (ERIC ED 051 676).

Describes the final stage in a self-instructional program. Such activities as polishing the material, revision, and evaluation are considered. Information is also given concerning compiling a program manual along with a glossary of terms.

Bjerstedt, A. System synthesis in instructional programming: The

intermediate phases of the program construction process. Malmö, Sweden: School of Education, Department of Educational and Psychological Research, 1971 (ERIC ED 051 675).

Describes the second stage in the construction of a self-instructional system. Various models of programming are outlined, types of responses are explored and the problem of determining the proper information for each instructional unit is examined.

Dewey, B. & Howard, R. Media and instructional technology in the library: A bibliography of readings. New York: Center for Instructional Communication, Syracuse University, 1971 (ERIC ED 049 805).

A comprehensive source of literature in the field of media and instructional technology. The bibliography is divided into four sections; (1) media and the library, (2) instructional technology, (3) periodicals related to instructional technology, and (4) a name index.

Egbert, R.L. & Cogswell, J.F. System design for a continuous progress school: Part II surveillance and detection system. (Report TM - 1493/104/00.) Santa Monica, Calif.: System Development Corporation, 1964 (ERIC ED 010 562).

A proposal by Dr. Edwin Read of Brigham Young University, for a surveillance and detection system to be used in a continuous progress school. The purpose of this system would be to monitor and survey study activities of students, detect problems in student performances and to alert the appropriate personnel. Diagrams of how the system works are included in the report.

Eriksson, B. Planning and construction of a university course in educational technology. Sweden: Institute of Education, Gothenburg University, 1968 (ERIC ED 019 003).

A summary of a one-year course in educational technology to be introduced at the University of Gothenburg. The course will consist of an introduction to education in relation to the structure of society, methods to determine educational objectives, planning and design of instructional criteria, methods, scientific analysis and evaluation.

Evans, N.D. Instructional systems for student learning: The Burlington County College approach. New Jersey: Burlington County College, 1971 (ERIC ED 051 812).

Describes a systematically designed approach to instruction and student learning developed at Burlington County College. A "Three Phase Systematic Instructional Development Model" outlines events that should be completed and the order in which they should be performed.

Exceptional Children Conference papers: Adoption of technology and program

development. Arlington, Va.: Council for Exceptional Children, 1970 (ERIC ED 047 440).

A selection of four papers presented at a special conference on instructional technology at San Antonio, Texas, in December, 1970. Such topics as adopting technology in local schools, instructional technology in curriculum development in mental retardation as partial fulfillment of community needs, and media and curriculum research and their implications for program development are examined.

Finn, J.D. et.al. A selective bibliography on new media and instructional technology. (Staff paper no. 1; Instructional technology and media project). Los Angeles: School of Education, University of Southern California, 1964 (ERIC ED 003 812).

An extensive Bibliography which groups media and technology into sixteen sections, such as implications of educational technology, research summaries and learning theory.

Geisinger, R.W. Systems analysis and educational research literature review. Harrisburg, Penn.: Bureau of Research, Administration and Coordination, Pennsylvania State Department of Public Instruction, 1968 (ERIC ED 047 354).

Discusses the applications of systems analysis to education by reviewing the main literature in the field. A 66-item bibliography is also included.

Instructional technology in teacher education. Washington, D.C.: Education Industry Cooperation, Associated Organization for Teacher Education, 1970 (ERIC ED 054 050).

Outlines a series of educational problems which show the need for and increased use of instructional technology. A list of six benefits of instructional technology is used as a basis for recommending changes in teacher education to include more courses in instructional technology. The report also includes recommendations for teacher organizations, teacher education and industry representatives.

Karwin, T.J. Instructional design, recorded instruction and faculty interests. Supplement, instructional design, recorded instruction and faculty interests within the University of California. (Occasional paper no. 2). Santa Cruz, Calif.: Santa Cruz University of California, 1968 (ERIC ED 020 682).

Considers a comprehensive policy outlining the interests, rights and responsibilities of faculty, institution and staff in relation to the design and development of new media. Included are two case studies of instructional design and a review of the policies of the University of California with respect to the criteria presented.

Merrill, M.D. & Harrison, G.V. Instructional research and development at Brigham Young University: A statement of philosophy and intent. Provo, Utah: Brigham Young University, 1970 (ERIC ED 053 076).

Describes some of the elements in Brigham Young University's Instructional Research and Development Program, which reflect the belief that a training program for specialists in instructional development must be different from a research training program.

Merrill, M.D. Organizing for instructional system development. Provo, Utah: Brigham Young University, 1970 (ERIC ED 053 077).

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